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MORPHOLOGICAL CHANGES IN BONES IN OSTEOPOROSIS (literature review)

Abstract. Osteoporosis - one of the most common bone diseases, and to provide patients with quality of life through timely application of the necessary treatment measures, reduce disability caused by osteoporosis, and provide the population with the most in-depth information on disease prevention to prevent this disease.

Keywords : osteoporosis, densitometry, calcium, parathyroid hormone, vitamin D.

INTRODUCTION

Osteoporosis is a chronic disease characterized by a decrease in bone density and their fragility . This disease usually develops gradually over years and is often detected when the risk of bone fractures increases.

Osteoporosis is more common in women, especially after menopause, but men and young people can also face this problem. Because in every organism, under the influence of parathyroid hormone, calcium is released from the bones which leads to osteoporosis[1].

Estrogen deficiency is also important in the onset of osteoporosis, because when the amount of these sex hormones decreases, osteoclasts become more susceptible to the influence of parathyroid hormone, the synthesis of the active form of vitamin D [1,25-(OH)₂-D] also decreases, which disrupts calcium absorption.

All of this together leads to increased osteolysis, leading to osteoporosis.

According to current ideas, primary osteoporosis is a multifactorial process that begins with various causes, and in its development, hereditary predisposition, increased parathyroid hormone levels in the blood, vitamin D deficiency, sex hormones, increased glucocorticoids, and a person's inactivity are important. However, regardless of the reasons for which osteoporosis begins, it is characterized by the same changes in the structure of the bones.

Osteoporosis can be local or generalized. Local osteoporosis is often caused by impaired blood circulation, for example, when an arm or leg is immobilized and remains immobile for a long time, which makes it difficult for venous blood to flow. In general osteoporosis, the entire skeleton, especially those areas where there are a lot of bone trabeculae, is subject to osteoporosis. That is why fractures of the spine and femoral neck are more common than others[2].

Destruction of bone tissue (deossification) is due to a decrease in bone formation and increased bone resorption. These phenomena lead to the expansion of Haversian canals (osteon canals). As a result of osteoporosis, the cortical substance of the bone loses its dense structure. The bone spongy substance thins, and

some of it is completely absorbed. As a result, the strength and hardness of the bones decrease, they change shape and become easily broken.

Clinical presentation. Patients complain of pain in the bones, especially the spine, which is often associated with bone fractures and dislocations. The most common fractures are the femoral neck and distal radius. These bones can also be fractured with minor trauma.

Causes of osteoporosis

1. Hormonal changes

Decreased estrogen levels in women during menopause.

Decreased testosterone levels in men.

2. Nutritional deficiencies Calcium and vitamin D deficiency leads to weakening of bones.

3. Lifestyle factors
4. Inactivity.
5. Genetic predisposition This risk increases if there is a family history of osteoporosis.
6. Other diseases and medications
7. Rheumatism, thyroid diseases, and steroid medications can cause osteoporosis.

Symptoms

In the early stages of osteoporosis, there may be no noticeable symptoms.

However, as the disease progresses, the following symptoms are observed:

Back or lumbar pain.

Shortness of stature (due to compression of the bones).

Fractures after minor injuries.

Poor posture, stooping.

Diagnosis of osteoporosis

Medical examination and diagnostic methods are used to diagnose osteoporosis:

1. Densitometry (measurement of bone mineral density) - the most reliable method.[3]
2. Blood and urine tests - to determine the level of calcium and vitamin D in the body.
3. X-rays - to assess the fragility of the bones.

Osteoporosis Prevention :

1. Healthy Eating

Foods play a key role in strengthening bone tissue.

Calcium-rich foods: Bones are the main place to store calcium. The following foods are good sources of calcium:

Milk and dairy products (cheese, yogurt).

Nuts (almonds, walnuts). Greens (spinach, broccoli).

Vitamin D: Necessary for the body to absorb calcium. Focus on the following sources:

Sunlight. Fish oil, egg yolks, and mushrooms.

Vitamin D supplements (if necessary).

Magnesium and phosphorus: Participate in maintaining bone structure. Nuts, seeds, meat, and whole grains are good sources of these.

2. Physical activity

Regular exercise strengthens bones and helps maintain their density.

Weight-bearing exercises: Exercises such as running, walking, dancing, and jumping increase bone density.

Strength training: Weight-bearing exercises (such as dumbbell lifting) stimulate bone tissue.

Improve balance: Exercises such as yoga and Pilates reduce the risk of falling, which is important in preventing fractures.

3. Quit bad habits

Smoking: Smoking accelerates bone loss and reduces calcium absorption.

4. Control hormones

Osteoporosis is more common in women during menopause due to a decrease in the hormone estrogen. On the advice of a doctor, hormone therapy or other medications may be recommended for prevention.

5. Special supplements for bone health Calcium and vitamin D supplements: Recommended for people who cannot meet their daily needs. Bisphosphonates: Drugs that slow down the breakdown of bone tissue.

6. Improve lifestyle

Prevent falls: This is important for older adults. The floor at home should not be slippery, good lighting and safe shoes should be worn.

Medical examinations: Bone density measurement (densitometry) can assess bone condition and detect the problem early[4].

Treatment

1. Medications

Calcium and vitamin D supplements.

Bisphosphonates (drugs that increase bone density).

Hormonal therapy (estrogen replacement drugs in women).

2. Nutrition and supplements Calcium-rich products: milk, cheese, broccoli.

Vitamin D sources: fish, eggs, sunlight.

3. Physical exercise Light exercises that strengthen bones and muscles (walking, swimming, yoga).

4. Prevention and lifestyle changes

Quitting tobacco and alcohol.

Choosing a healthy lifestyle.

Regular medical check-ups.

Osteoporosis statistics

Osteoporosis is a widespread and serious public health problem worldwide. Below are the most current statistics on this disease:

World statistics1. Prevalence:According to the World Health Organization, more than 200 million people worldwide suffer from osteoporosis. Every third woman and every fifth man will experience a bone fracture due to osteoporosis after the age of 50.2. Hip fractures

Every year, 8.9 million fractures worldwide are caused by osteoporosis. That's one fracture every second.

20-30% of hip fractures are fatal within a year, especially in older adults.

3. Geographic differences: Osteoporosis is more common in North America and Europe, especially in winter, due to less sunlight. The disease is also spreading in Asia, especially in Japan and China[5], due to an aging population. The situation in Uzbekistan and Central Asia There are few accurate statistics on osteoporosis, but: The risk of osteoporosis is high in Central Asia, especially among women. Poor nutrition, vitamin D deficiency, and an increasing number of older adults are the main risk factors. Treatment for hip fractures and other bone injuries has increased in recent years. Prevalence in older adults One in two women and one in three men over the age of 70 suffer from osteoporosis or osteopenia. Bone density loss in women after menopause is 2-5% per year.

CONCLUSION

Healthy lifestyle choices, proper nutrition, and regular physical activity are important for preventing osteoporosis. If you are at risk of developing osteoporosis it is important to consult a doctor in a timely manner and take the necessary preventive measures. Paying attention to bone health is the key to a long and happy life.

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